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The Accounting Technique for Standard Costs

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Editorial Department Note

Standard costs, a comparatively new development in cost accounting, is constantly gaining new adherents as a fuller realization and appreciation are had of its value to the management of a business enterprise. The type of analysis which can be secured through its use is an invaluable aid to anyone engaged in attempting to control the course of business operations. The attention which the subject is receiving on Chapter programs during the current year and on programs of the annual meetings of the National Association of Cost Accountants bears evidence of its timely interest.

We are glad, therefore, to present as an Official Publication a contribution to this subject dealing rather specifically with the development of an accounting technique devised for the purpose of incorporating the standard cost procedure into the regular books of record and so securing a control through the general books of account. This paper was presented before a recent meeting of the Boston Chapter, N. A. C. A.

The author, Henry W. Maynard, prepared for his career in cost accounting by starting out to be a civil engineer. Born in Washington, D. C., he was graduated from Cornell University in 1907 as a civil engineer; having also studied something of mechanical and electrical engineering. After graduation he spent three years in the United States Coast and Geodetic Survey, including two hydrographic assignments and two seasons in the Rocky Mountain regions. He began his industrial career in the city of Cleveland with the Brown Hoisting Machinery Co., where he spent eight years as a cost engineer during the last four of which he served as chief cost engineer, studying and analyzing the costs of large and small machines. During 1918 he was with the accounts division of the Bureau of Aircraft Production undertaking cost investigations and certain assignments of a special nature in connection with the building of planes and motors. He then spent three years on the New York staff of Scovell, Wellington & Company, installing cost accounting systems, after which he was engaged for one year with the General Electric Co., on special cost investigations for the comptroller's office, and for two years was assistant treasurer of the Salt's Textile Mfg. Co., in charge of accounting. While here he installed cost accounting systems in the main factory in Bridgeport, and in the Salt's Griswold Mills in Philadelphia. Since May, 1925, he has been factory accountant for the Gillette Safety Razor Company, Boston, Mass. Mr. Maynard is a member of the National Association of Cost Accountants and a director of the Boston Chapter. Having under contemplation a further expansion of this paper, he will appreciate any criticisms or suggestions relative to it.

THE ACCOUNTING TECHNIQUE FOR STANDARD COSTS

A remarkable trend is under way, in the practice of cost accounting, toward *standard costs*. The interest is general. Throughout industry, many manufacturers and cost accountants are studying to learn how standard costs can help them solve their individual problems. The tremendous benefits which a standard cost system may yield, not only for quantity production but even in many cases of jobbing or small lot manufacture, justifies a thorough investigation of all its phases and methods by any person responsible for manufacturing economies and financial control.

Nevertheless, in spite of all that has been written on the subject, there is a great deal of the most vital nature which has not yet been published. So far, emphasis has been laid on the basic advantages of the standard cost system and on the calculations by which variations from standard are determined. It is the purpose of this paper to present a method by which the system is definitely "tied in" to the books, and made an integral part of the accounting structure.

The Importance of Making Standard Costs Part of the Accounting Procedure. A great many manufacturers think that they have a system of standard costs when they only have standard statistics. The variances from standard are established monthly by calculation and are reported to the management for control purposes, but these variances are allowed to remain in the inventory accounts and are even permitted to accumulate until physical inventory is taken. This applies not only to the many plants where Work in Process is charged with actual labor and expenses and materials used, and Cost of Sales valued at standard costs; but also to cases where the manufacturer has "adopted a standard cost system", but half-heartedly and without full acceptance of its basic principles. The weakness of such a procedure is not only that current profits are misstated and inventories distorted, but even though the variances from standard are reported statistically, it is certain that they will not receive the consideration warranted by their importance, nor will they be determined with the same degree of care as though actual accounting entries depended on them. It is true that much of value for purposes of control may be obtained if variations from standard are reported statistically. In fact, such a "half-way" method is often temporarily necessary. But except as an intermediate stage, such a procedure is wholly undesirable, since it evades an important principle.

When cost standards are set to measure the efficency of manufacture, it should be only on the definite acceptance of the principle that these standards *are the true costs.* This means that variations from the standard costs, from whatever cause, whether due to foreman's inefficiency, to errors on the part of the management, or to the failure of the sales department to obtain sufficient orders, are considered as due to occurrences which are extraneous to regular efficient operation, are not the standard and proper costs of normal manufacture, and are therefore to be written off promptly to profit and loss. This principle is fundamental, and until it is definitely accepted by the management, the standard cost system should not be developed to the extent outlined in this paper.

It is essential that the standards, once set, must be unshakable. To start a standard cost system, tied in to the books, which is based on inaccurate standards, is to court disaster. However, the manufacturer and the cost accountant, if they are wise, will recognize that "approximate standards" serve only as a temporary expedient; that the establishment of the proper basis for cost calculations, and of accurate and dependable standards, is of vital importance and

should be pushed steadily forward; and that the real goal, to be attained as soon as the proper data are obtained, is to embody the standard system as a part of the cost accounting procedure.

Lay the Foundation Right. It is of the utmost importance that the foundation for a standard cost accounting system be substantially laid. Certain conditions are prerequisite. First of all—a point which Mr. J. P. Jordan has been emphasizing during the past two years—the *organization itself* must be adequate in its capacity and sound in its morale before *any* sort of new cost control can be instituted. Second, the management must definitely accept the principle that the inventories, under the standard cost system, will be valued at the standard costs. And third, the standards themselves must be established with such care, and so definitely approved by the management, that confidence in them will not be shaken. All of these things are necessary before the system is started, no matter what the delay in time.

Every professional accountant and nearly all industrial accountants have doubtless, at some time, been faced by a manufacturer who, because his company was in financial difficulties and he hoped for relief from his troubles ,insisted on immediate results from the new cost system. If a company is under financial stress, it is no time to start to install a cost control. The only man who can serve the manufacturer under such a condition is one of the brilliant financial pinch hitters, who comes dramatically into an organization, picks out some weak spots, prepares a few striking reports from data already accumulated which had been overlooked or unappreciated, and recommends some sweeping changes and the discharge of half a dozen principal men. Such emergency treatment may help a sick company, but it is not the remedy for a strong going concern and, in any case, the effect of such powerful stimulant is inevitably temporary. It is only by real constructive cost accounting of the highest order, carefully planned and deliberately carried out, that permanent security—permanent as much as anything is permanent in the modern industrial world—can be achieved. Every manufacturer who knows that he is wasting money is impatient to stop the leaks, but no matter how impatient he may be, the cost accountant, if he is wise, will definitely refuse to go ahead until the foundation has been securely laid. If he fails to take these precautions, the specter of his insecurity will rise to haunt him.

The Value of Standard Costs. What is the great value of a standard cost system, this mysterious advantage for which so much has been claimed? It lies in the fact that we are enabled to establish a "yardstick", a normal, a "bogey", by which we measure each month, or if necessary each week or each day, the factory's efficiency in terms of values. Let us not claim too much. This control is not the exclusive monopoly of cost accounting. Factory efficiency, in terms of *quantity*, is obtained through *production control*. But the overwhelming importance of *value* control, in cost elements which quantity control cannot illuminate, and the service

rendered by the detailed determination of variations from the yardstick, give cost accounting control a value to American industry the cumulative effect of which is going to be tremendous.

The Flexibility of Standard Costs. It is a great advantage that standard costs may be employed to as small or as great an extent as conditions in the factory warrant. They may be developed progressively and put into operation step by step for various items of cost. Standard costs may be used for material or for labor or for burden, for all three or any combination, or for certain items of the material and labor. Of course the value of the system increases in rapid proportion as more costs are put on standards.

Fundamental Principles of Cost Accounting Control. Before taking up the details of the accounting entries, and even though we still further extend this preface, let us digress briefly to review some of the fundamental principles of cost accounting. It may, at first thought, seem superfluous to refer in this paper to such a simple thing as the kinds of cost systems; I do so only because even today there is some misunderstanding on the subject and because most of the text books and courses give, unfortunately, definite misinformation.

There are two basic types of cost system: (1), the job order system, in which the cost cut-off is made at the end of a given *quantity of product*, and (2), the process cost system, in which the cost cut-off is made at the end of a given *period of time*. What are known as the operation system, etc., are special types of the process system. An alternative, in a class by itself, is the system of class costs, such as is used for foundries.

Unit costs are obtained differently under each system. With the job order system the total cost charged against the order is divided by the net number of good pieces produced to obtain the cost of each. Under the process system this cannot be done. Here the costs of performing the various operations for the accounting period are divided by the respective quantities produced to give the operation unit costs. The latter must be adjusted for factory spoilage—unless the spoilage cost is written off to burden or a special profit and loss account—and are then totalled to give the unit cost of the finished product. There are sundry practical complications which do not need to be described here.

The job order system may be used with either actual or standard costs. The process cost system may also be used with either actual or standard costs; and it is the combination of the *process* cost system with standard costs which is the most suitable general type for all quantity production; that is, for all kinds of manufacture except that of the jobbing shop. The process cost system with standard costs, sometimes incompletely referred to as the "standard cost system", has become so tremendously important to American industry partly because it involves so complete a change in the point of view from the old accepted idea of the job order system with actual costs. The change occurs in two steps: first, from job order to process system, and second, from actual costs to standard

costs—a fact which is not fully appreciated, but is a major part of the far-reaching economic change that is making cost accounting control of primary importance to the manufacturer.

And here I want to repeat, because it is so important that it can hardly be overemphasized, that the basic principle of the standard cost system is the establishment of a definite and carefully determined "yardstick", and the value to the management of the feature of cost control lies in the prompt reporting of the variations of actual performance from the predetermined standard, and the reasons therefor.

Let Us Talk the Same Language. Now we come to the practical methods. But as you read further, there is apt to be some misunderstanding. The technique and terminology of cost accounting, in spite of the really striking progress that has been made since the National Association of Cost Accountants was organized, is still a long, long way from being standardized. A given result may be arrived at by ways which apparently are unrelated. Methods of monthly burden distribution may be strikingly different. Burden ledgers, factory or cost ledgers, journal entries, and monthly cost reports, may be quite unlike in name, appearance, and treatment. Therefore, if in the pages which follow the reader comes upon names and methods which appear strange, he is asked to remember that there may be various ways of doing the same thing. A little study may disclose to him that an apparently strange procedure is merely another way of arriving at a familiar result. As long as he achieves the result, it makes little difference whether he uses one means or another. Be assured that the procedure here described passes the fundamental test—it works.

The Nature of Price and Quantity Variances. For each element of expense, whether material or labor or burden, the variation, or to use the technical term, the "variance" between standard and actual, is of two-fold origin. There is a *price* variance and a *quantity* variance, the nature of which is indicated by the following table:

	Price Variance	*Quantity Variance*
MATERIAL	Purchase Loss and Gain	Manufacturing Loss and Gain
LABOR	Difference between standard and actual wage rates.	Operator's Efficiency
BURDEN	Expense Variance	Machine Efficiency

In addition there is for burden an *activity* variance—a variance between actual and standard use of the manufacturing equipment—which is the cost of idle facilities.

Special Variances. In addition to the foregoing, there are sundry variances of a special nature, which differ more or less according to the individual plant. Standardized conditions of manufac-

ture imply a regular way of performing each operation and a definite allowance for factory spoilage and defective work. Each of these conditions may yield a variance. Furthermore, the standards themselves change—on the one hand, as additional operations are instituted for improving the product, and on the other, because of simplified methods of production. An important feature of the cost control is the complete and definite segregation of cost changes due to improvement of product from those due to simplified processes, and those due to differences in efficiency or expense.

List of Standards and Variances. Diagram 1, pages 548-9, gives a typical list of the factors used as the basis for standard costs, and the corresponding variances. It also shows the manner in which the total variance is supported by monthly operating statements covering the individual variances.

No fixed list of variances can be made. Mr. G. Charter Harrison, in his book "Cost Accounting to Aid Production", 1924 edition, page 207, gives (besides the total) twelve kinds of variations, which agree in general with the foregoing, but differ in detail. For purposes of comparison, Mr. Harrison's full list of variances is given below:

1. The variation in total.
2. The variation due to the revision of the standard.
3. The variation due to the use of an alternative standard.
4. The variation in cost resulting from the number of working days in the month being more or less than the number of working days in the standard month used as a basis for figuring standard cost.
5. The variation in cost owing to idle time.
6. The variation due to the production per day or hour being more or less than standard.
7. The variation due to fluctuations in rates of pay.
8. The variation due to fluctuations in the hours worked as compared with standard.
9. The variation due to differences between the actual and standard price paid for material.
10. The variation in the quantity of material used.
11. The variation in the price of service such as power, light, etc.
12. The variation in the quantity of service consumed.
13. The variation in expense.

No two factories present the same cost problem, and it is unlikely that two factories would show on their periodical statements exactly the same list of variances.

Accounting for Different Materials. Different materials may be treated differently in the same plant; for example, one particularly important material may be charged at actual cost, while, at the same time, standard costs are used for a dozen minor materials.

Accounting for Variations—Basic Procedure. Let us consider, with the aid of diagrams, the fundamental accounting principles involved.

BASIS OF STANDARD COSTS, AND EXPLANATION OF VARIANCES THEREFROM.
MONTHLY OPERATING STATEMENT.
INCOME FROM SALES (Net)

BASIS OF STANDARD COSTS, AND EXPLANATION OF VARIANCES THEREFROM. MONTHLY OPERATING STATEMENT.

INCOME FROM SALES (Net)—This is the figure on our regular monthly operating statement and represents gross sales less returned goods and less allowances, freight, parcel post and insurance.... $000

LESS: COST OF SALES AT STANDARD MANUFACTURING COSTS, which are based on:..... 000

Material	(1) Standard Unit Cost
"	(2) Standard Material Quantity per Unit of Product (based on the quantity made in the first operation, as recorded at first point of count; for subsequent spoilage see Item 10).
Direct Labor	(3) Employee's Standard Base Rate.
" "	(4) Standard Production, of pieces per hour.
Burden	(5) Normal Budget.
"	(6) Standard Percentage of total time that machines are expected to run (in main machine centers).
"	(7) Standard Production by machines of pieces per hour (in main machine centers).
Processes	(8) Standard Method of Manufacture (List and Arrangement of Operations).
Operation	(9) Standard Way of Performing each Operation.
Spoilage	(10) Standard Allowance for Factory Spoilage.

GROSS PROFIT FROM OPERATIONS..... $000

LESS: ADJUSTMENTS TO MANUFACTURING COST (Variances from Standard)

Note. This entire bracket is shown on the Operating Statement as one value, supported by a schedule giving each Variance as listed below, and this in turn by the full set of cost reports, which give the necessary details for each Variance.

		Variance is Difference Between	*Detail on Supporting Schedule*	
Material	(1) Purchase Loss and Gain	Actual unit cost—Standard unit cost	Each Major class of material	$000
"	(2) Manufacturing Loss and Gain	Actual quantity consumed—Theoretical quantity consumed	Do.	000
Direct Labor	(3) Base Rate Variance	Employee's actual base rate—Employee's standard base rate	Each department	000
" "	(4) Efficiency Variance	Actual production per hour—Standard production per hour	Do.	000

Burden	(5) Expense Variance	Actual expense	—Budget for actual amount of activity	Each department and each main class of expense	000
"	(6) Cost of Idle Facilities (in main machine centers)	Budget for actual amount of activity	—Value of machine activity (active machine hours at machine hour rates)	Each department	000
"	(7) Efficiency Variance	Value of machine activity (as in 6, above)	—Standard cost of pieces based on standard speed of output	Each department and each kind of product	000
Processes	(8) Changes in the Standard Method of Manufacture			Each kind of product	000
Operation	(9) Extra Cost of Any Operations Performed in a Way Other Than Standard			Each operation	000
Spoilage	(10) Spoilage Variations	Actual cost of spoilage	—Standard allowance for spoilage	Each department and each kind of product	000
Total Adjustments to Manufacturing Cost					$000
NET PROFIT FROM OPERATIONS					$000

Note. The cross reference figures in parenthesis above indicate each standard in relation to its variance.
Note. Other variances than those listed will be provided for as they arise.

DIAGRAM 1.

The fundamental transaction, in ordinary industrial accounting, is to credit the actual costs to a Stores or Suspense account and charge them to Work in Process, later crediting Work in Process and charging Finished Stores, (or Cost of Sales if there is no Finished Stores account) with the value of goods shipped. This is indicated on Diagram 2, as follows:

BASIC ACCOUNTING PROCEDURE, USING ACTUAL COSTS

Stores or Suspense Account		Work in Process		Finished Stores (or Cost of Sales)	
(1) Stores Account — or (2) Payroll (Suspense Account)—for Labor or (3) Sundry Expense Accounts—for Burden					
Dr. Expenditures Incurred	Cr. Expenses Operation	Dr. Consumed for Performed	Cr. Value of Product Completed at *Actual* cost	Dr.	Cr.

DIAGRAM 2.

When we employ standard costs, however, the credits to Stores or Suspense accounts must be divided—only the standard cost of the operations performed is charged to Work in Process, and the balance, which represents the variances, is written off to a Profit and Loss account. Therefore we insert, between the Stores or Suspense account and Work in Process, an intermediate account, which is generally called by some name such as Scheduled Material (or Labor, or Burden) in Process. This account is charged with the total cost, which, under the first condition, was debited to Work in Process, but after the proper calculations are made the credit to it is divided, the standard cost of operations performed being charged to Work in Process and the balance—which is the variance—being charged to a Profit and Loss account of proper name, such as "Variance from Standard Cost-Material." By this means the work in process (that is, the inventory) is carried at standard costs only, and all variances are taken out currently. This method is shown in Diagram 3, page 551.

In principle, this method is simple enough. It is when we come to the practical details that we find the complications. The paragraphs which follow deal with such situations as are ordinarily met; and the methods given will indicate the means which may be employed to solve special problems as they arise.

Accounting Procedure for Material. Diagram 4, page 552 gives, in chart form, the accounting procedure for material. You will note that in this particular case we can usually do without the intermediate or scheduled account, by the expedient of taking a monthly departmental "floor inventory" of material issued from stores but not yet processed, and by carrying down the inventory in the material division of the Work in Process account, as a bal-

ance forward for the next month; the remaining balance is the total material variance which is closed out to the account of that name.

BASIC ACCOUNTING PROCEDURE, USING STANDARD COSTS

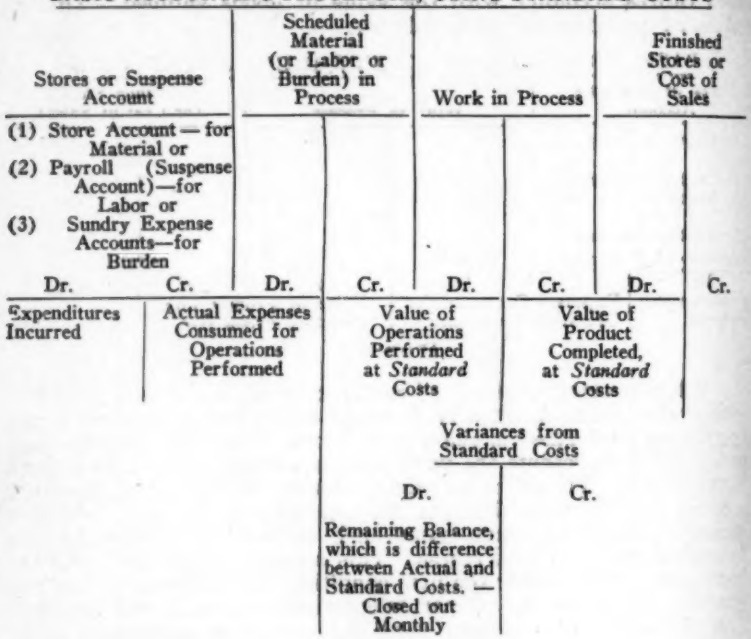


DIAGRAM 3.

Purchasing and Manufacturing Loss and Gain. The total material variance from standard cost in any account is a combination of: (1) a purchasing loss or gain, in that the unit cost of material actually issued from stores was more or less than the standard value on which the cost records and work in process accounts are based; and (2) a manufacturing loss or gain, in that the operating departments have consumed a greater or less *quantity* of material than standard. The variance in each class of material is separated into these elements by the method which is indicated in Diagram 5, page 553:

The symbols are:

A Actual Pounds
B Theoretical Pounds
a Actual Cost per Pound
b Theoretical Cost per Pound

Diagram C.

1. ACCOUNTING FOR STANDARD COSTS - MATERIAL

Accounts Payable

Dr.	Cr.
	Actual quantities purchased x Actual costs

Raw Material Inventories (Subdivided as necessary)

Dr.	Cr.
Actual quantities purchased x Actual costs	Quantities actually issued from stores x actual costs. Note 1.

Work in Process Material A single account unless necessary to subdivide, - see Note 1 on burden diagram.

Dr.	Cr.
Opening balance monthly "floor inventory" of material issued from stores but not yet processed, at standard costs. Note 2.	Standard quantities x standard costs in product actually completed
Monthly "floor inventory" as above, at standard costs, carried down as a balance forward. Note 2.	

Finished Stores Subdivided by classes of product if necessary.

Dr.	Cr.

Alternative Method
(Purchase Variance written off at the time material is received)

Accounts Payable

Dr.	Cr.
	Actual quantities purchased x Standard costs

Raw Material Inventories (Subdivided as necessary)

Dr.	Cr.
Actual quantities purchased x Standard costs	

Purchase Loss and Gain

Dr.	Cr.
Actual quantities purchased x difference between actual and standard costs.	Closed each month to Profit and Loss. Note 3.

Variances from Standard Cost, - Material

Dr.	Cr.
Remaining balance (debit or credit) which is the total material variance, is closed out monthly.	Closed each month to Profit and Loss-Note 4.

Total Variance is analyzed by calculation into:
1. Purchase Loss and Gain (total quantity issued x difference between actual and standard costs);
2. Manufacturing Loss and Gain (actual less standard quantity issued x standard costs.) Note 3.

Note 1. - Sometimes it is necessary to insert, between Inventory and Work in Process accounts, an account Scheduled Material in Process (one for each major class of material) with entries: Dr. Actual issues x actual costs. Cr. Standard consumption x standard costs. Balance is the total material variance to be analyzed as above.

Note 2. - For strict accounting accuracy, the monthly floor inventory must be calculated at both actual and standard costs; the latter credited as the closing balance, the former debited as the opening balance, and the difference written off as part of the Purchase Variance. However, if the value of the floor inventory from month to month is the same, no error is introduced by using standard values for both postings, and in practice the discrepancy is usually so small that the latter method is followed.

Note 3. - This treatment avoids necessity of separate accounts for Purchase Variance and Manufacturing Variance.

Note 4. - Included in Operating Statement in bracket "Adjustments to Manufacturing Cost". Detail is given in monthly statement.

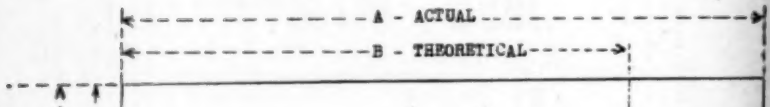
Therefore,

Aa Total Actual Cost
Bb Total Theoretical Cost
Aa - Bb=Total variance to be analyzed

Diagram 2.

VARIANCES FROM STANDARD COST, MATERIAL

CALCULATION OF MANUFACTURING AND PURCHASING LOSS AND GAIN.



The diagram shows that the small rectangle marked "R" is thus applied to *purchasing* loss and gain and not to *manufacturing*. This decision is based on the principle that the manufacturing organization should be concerned solely with the quantity of material consumed at standard cost; and that the purchasing department should be held responsible for the unit *cost* of all material purchased, no matter what the *quantity* might be, since they have no means of knowing or controlling the quantity which the manufacturing organization will consume.

Purchasing and manufacturing variances are written off together in the journal entry, as a single item, but in the monthly variance reports are separated by the calculation given on Diagram 5, page 553.

The foot-note on Diagram 4, page 552, gives further explanation of the details of the procedure for material.

Accounting Procedure for Labor—Diagram 6. The procedure for labor is the simplest of the three. Diagram 6, page 555, shows the method used. A Scheduled Labor in Process account is maintained for every department or burden center having standard direct labor rates. The credit to the scheduled account is split, work in process being charged with the standard rate times the actual production, the balance being closed out monthly to the profit and loss account for Variances from Standard Cost,—Direct Labor. There is a single labor variance account, to which one debit is made for all departments, this debit being supported by the detail in the monthly variance statement.

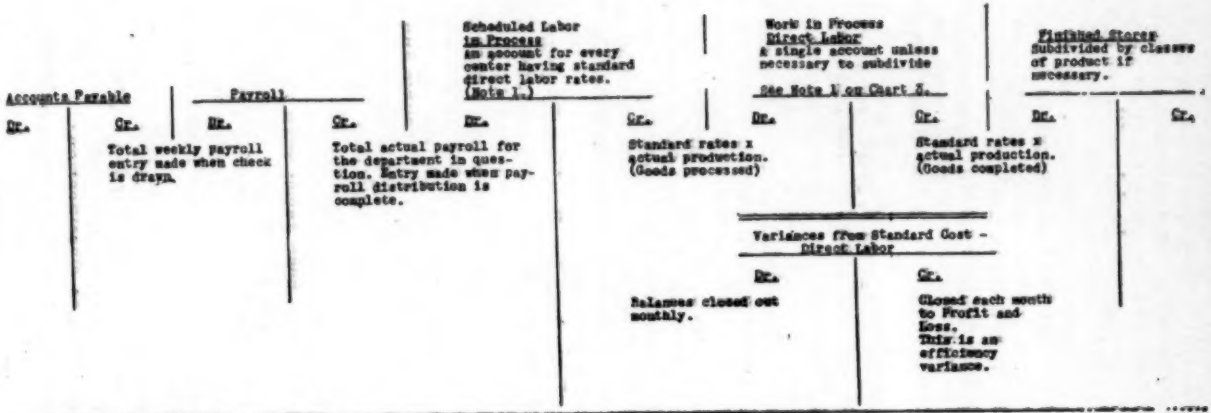
Accounting Procedure for Burden—Diagram 7. The accounting procedure for burden is far more complex than for either of the others, because of the different factors involved. To begin with, each expense is charged to an expense account on the general ledger (not the factory or cost ledger) before any accounting distribution is made. Experience has proven the maintenance of this group of accounts to be well worth the trouble and expense of keeping them, since by this means expense summaries for the entire plant can be readily obtained (especially important at the end of the year when the income tax reports are prepared) without the necessity of unscrambling the complications of the burden ledger. Any accountant who has been faced with the latter situation will endorse the opinion. The charges are "washed through" these expense accounts each month, and passed through the General and Cost Ledger Controlling Accounts (assuming that a separate cost ledger is maintained), and the expenses are distributed and charged in the burden ledger.

To digress for a moment, my preference is for a burden ledger consisting of a sheet for each burden center. The ledger sheet bears distributive columns, so that debits are posted according to, say, the following expense classification:—

Fixed Charges (total of Taxes, Insurance, Depreciation, Light and Heat)

Diagram 6.

8. ACCOUNTING FOR STANDARD COSTS - DIRECT LABOR


Accounts Payable
Dr.
Cr.
Total weekly payroll entry made when check is drawn.
Payroll
Dr.
Cr.
Total actual payroll for the department in question. Entry made when payroll distribution is complete.
Scheduled Labor in Process
an account for every center having standard direct labor rates. (Note 1.)
Dr.
Cr.
Standard rates x actual production. (Goods processed)
Work in Process
Direct Labor
A single account unless necessary to subdivide
See Note 1 on Chart 7.
Dr.
Cr.
Standard rates x actual production. (Goods completed)
Finished Stores
Subdivided by classes of product if necessary.
Dr.
Cr.
Variances from Standard Cost - Direct Labor
Dr.
Balances closed out monthly.
Cr.
Closed each month to Profit and Loss. This is an efficiency variance.

NOTE 1 - Where actual direct labor costs only are used, entry is made directly from Payroll to Work in Process. Same method as shown on Chart 5 - Burden.

Indirect Labor
Compensation and Group Insurance
Indirect Materials
Supplies
Repairs
Steam
Electric Power
Gas
Water
General Mill Burden
Redistributed Centers
Miscellaneous Charges

After the debits are posted, the total burden of indirect and service centers (steam plant, power plant, repair and construction shops, general mill burden, and the like) are redistributed, until all the expenses are carried by the direct centers, from which they are handled as described below. Further detail of this method for handling the burden ledger will be found in my article on this subject in "Management and Administration" for December, 1923.

Determination of the Burden Variances. Our problem now is to divide the total burden carried by the direct centers,—to charge Work in Process with the burden value of goods processed at the standard costs per unit of the product, and to divide the unabsorbed balance, which is the total burden variance, into its elements. This method is rather complicated, and requires some study for full understanding, but it is so important as to be well worth the necessary effort to become familiar with it.

We have, to start with, the following information:—

(a) Normal budget of expenses, for the normal amount of production which was the basis of the cost calculations.
(b) Normal or standard machine hour rates (in the principal machine departments).
(c) Normal or standard cost rates per unit of product, for all operations.
(d) Actual expenses for the period.
(e) Actual machine hour activity for the period.
(f) Actual production for the period.

From these we determine:—

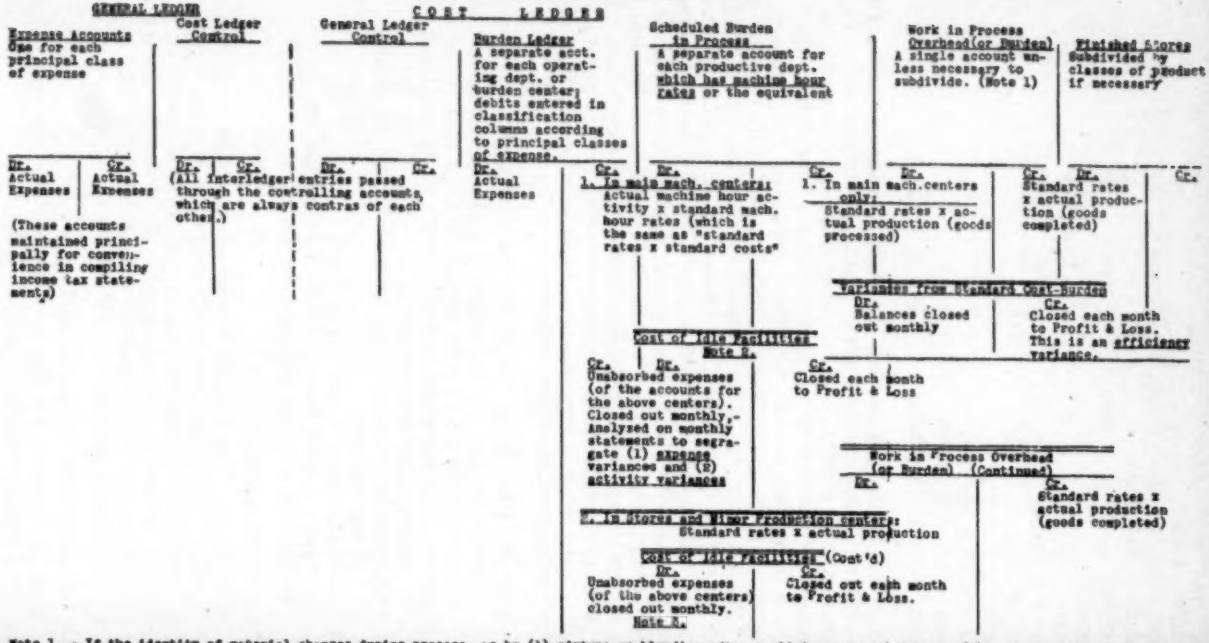
A. (From a) Theoretical budget of expenses to correspond with the actual production of the period, calculated from the normal budget by the method described later.
B. (From b and e) Machine activity value for the period.
C. (From c and f) Standard cost value (burden) of product made during the period.

The total net difference to be analyzed is:

D. Actual expenses for the period, (d), less the cost value of the product made, (C).

Diagram T.

2. ACCOUNTING FOR STANDARD COSTS.-BURDEN


GENERAL LEDGER
COST LEDGERS
Expense Accounts
One for each principal class of expense
Dr. Actual Expenses
Cr. Actual Expenses
(These accounts maintained principally for convenience in compiling income tax statements)
Cost Ledger Control
Dr.
Cr.
(All interledger entries passed through the controlling accounts, which are always contras of each other.)
General Ledger Control
Dr.
Cr.
Burden Ledger
A separate acct. for each operating dept. or burden center; debits entered in classification columns according to principal classes of expense.
Dr. Actual Expenses
Scheduled Burden in Process
A separate account for each productive dept. which has machine hour rates or the equivalent
Dr.
Cr.
1. In main mach. centers: Actual machine hour activity x standard mach. hour rates (which is the same as "standard rates x standard costs"
Work in Process Overhead(or Burden)
A single account unless necessary to subdivide. (Note 1)
Dr.
Cr.
1. In main mach.centers only: Standard rates x actual production (goods processed)
Finished Stores
Subdivided by classes of product if necessary
Dr.
Cr.
Standard rates x actual production (goods completed)
Variances from Standard Cost-Burden
Dr. Balances closed out monthly
Cr. Closed each month to Profit & Loss. This is an efficiency variance.
Cost of Idle Facilities Note 2.
Cr. Unabsorbed expenses (of the accounts for the above centers). Closed out monthly,- Analyzed on monthly statements to segregate (1) expense variances and (2) activity variances
Dr.
Cr. Closed each month to Profit & Loss
Work in Process Overhead (or Burden) (Continued)
Dr.
Cr. Standard rates x actual production (goods completed)
2. In Stores and Minor Production centers: Standard rates x actual production
Cost of Idle Facilities (Cont'd)
Dr. Unabsorbed expenses (of the above centers) closed out monthly. Note 3.
Cr. Closed out each month to Profit & Loss.

Note 1. - If the identity of material changes during process, as by (1) mixture or blending after preliminary processing, or (2) a change from production in the mass to individual articles, a new work in process account and a new intermediate stores account is required for each such step.

Note 2. - This account may be called (1) Cost of Idle Facilities or (2) Unabsorbed Expense or (3) Unliquidated Overhead, or (4) Unearned Burden & Variance. It is a profit and loss account, closed out each month, including in Operating Statement in bracket "Adjustments to Manufacturing Cost".

Note 3. - Unabsorbed expenses of stores and minor centers are not exactly "Cost of Idle Facilities", but difference is usually too small to require the same accounting detail as the others.

As already stated, one of the foregoing variances, which applies to the principal machine centers where machine hour rates have been calculated, is due to differences between the number of hours taken as standard in setting the cost rates, and the number of hours the machine actually ran. Mr. G. Charter Harrison goes a step further; he puts aside the difference between the theoretical number of operating hours and the hours when the factory was actually open for business, and leaves as a remainder the true cost of idle facilities.

In the storerooms, and in minor production centers, the cost of idleness ordinarilly cannot be obtained, but the expense of such centers is usually too small to warrant the same refinement of accounting procedure as in the principal departments.

Referring again to Diagram 1, the unknown quantities necessary to determine the several burden variances are obtained as follows:

Cross Ref. No.	*Burden Variances*	*Variance is Difference between*	
5.	Expense Variance	d. Actual expense	A. Budget for actual amount of activity
6.	Cost of Idle Facilities (in main machine centers)	A. Budget for actual amount of activity	B, Value of machine activity
7.	Efficiency Variance	B. Value of machine activity	C. Standard cost value (burden) of product made

The foregoing calculation is proved by adding the three variances together: Items A and B cancel out, leaving as the total burden variance the actual expenses less the standard cost value of product made.

See also "Cost Accounting to Aid Production", by G. Charter Harrison, page 208 *et seq.*

The Scheduled Burden Accounts. To provide for the proper accounting control, we open a series of accounts for Scheduled Burden in Process—a separate account for each production department *which has machine hour rates,* or the equivalent. Each account is credited with the actual machine hour activity multiplied by the standard machine hour rates, and the balance, which is the total of Variances 5 and 6 above, is written off to the account known variously as (1) Unabsorbed Expense; (2) Unearned Burden and Variance; (3) Cost of Idle Facilities; or (4) Unliquidated Overhead.

The third and final step in determining the burden variances

comes when we credit Scheduled Burden in Process and charge the Burden division of Work in Process with the actual production (goods processed) extended by the standard rates per unit of product, and write off the remaining balances, which represent the comparison of efficiency or *speed*, to Variances from Standard Cost—Burden. As in the case of material and labor, a single variance account is sufficient, being supported by the detailed statement.

Monthly Statement of Expense Variances and Idle Facilities. The analysis of expense variances and cost of idle facilities is made according to some such departmental monthly burden statement as the following, which is probably too well known to require detailed description.

DEPARTMENTAL MONTHLY BURDEN STATEMENT

Burden Center		Budget of expenses which should be necessary for actual extent of activity	Actual Expenses	Earned Burden (Value of Machine Activity	Expense Variances	Unearned Burden (Cost of Idle Facilities)	Unearned Burden and Variance (Net amount debited to above acct. and credited to Burden Ledger)
No.	Name	1	2	3	2 – 1	1 – 3	2 – 3

Variability of Expenses. A word of explanation is necessary as to the means by which we determine the budget of the actual expenses for the month. In the first place, it is assumed that when we established our standard burden cost rates, the following procedure was adopted:

(1) Decision on the quantity of finished production to be used as the basis of all the burden and cost calculations.

(2) Decision on the burden centers to be used for the departmental distribution of expense.

(3) Determination of the output of each department, from raw material to finished goods, according to the basis of burden already adopted, (in other words, making allowance for spoilage).

(4) Analysis of all the expenses chargeable to manufacturing cost, and the establishment of normal figures for each expense item to correspond with the basic production; that is, the figures for a normal budget.

(5) The distribution of these expenses to the various departments, and the further distribution of the total expenses of the indirect or service centers to the direct operating departments.

(6) Calculation of normal machine hour rates in the princi-

pal machine centers, and rates in the minor centers at percentage of direct labor or such other basis as is necessary.

(7) Determination of the burden cost rates per unit of product, employing standard speeds of production which have been carefully worked out.

Having determined the normal budget, our problem now is to determine a revised budget for the actual production for the period. This may be done by applying a calculation based upon the *variability* in expenses. Each expense will, within certain limits, vary in *some* ratio according to variations in the amount of production. For example, fixed charges, such as taxes, insurance and depreciation, will have a zero variability. The variability of direct labor and the consumption of power for manufacturing will be close to 100%. The variability for supplies, repairs and similar current expenses will probably run in the neighborhood of 70% or 80%. A careful analysis of each expense item or classification, based on the combined judgment of the men best fitted to know, will give good working figures.

This percentage of variability is also theoretically the amount by which the expenditure will be increased if the production were *doubled*. If, then, the production were to be increased or decreased by, say, 10%, the change in an expense item whose variability is 70%, would be 7% of the normal burden figure; and if the production were *zero*, 30% of the normal budget figure would be left as the basic expense of a factory ready to operate, but producing nothing. The given production for any month (whether the actual production taken historically, or the quantity scheduled before the month is started, or an estimated quantity established shortly before the end of the month), is used in obtaining the actual budget by applying the proper variability calculation to the different expense items of the standard budget.

Monthly Cost Reports. For each variance, or each combination of variances, a monthly cost report is made. It shows side by side the budget for the month, the actual performance and the variance, the latter analyzed in such detail as is necessary. For example, for material, the purchasing loss and gain and the manufacturing loss and gain would be shown for each major class of material, and possibly with some detail as to materials of different size. For labor, the variance for base rates would be shown by departments, and the variation in efficiency by departments and perhaps by operations as well. (Refer to Diagram 1). The foregoing is sufficient to indicate the detail which may be shown in the monthly reports, the sole criterion being the value of the information to the management for control purposes, compared with the clerical expense of obtaining it.

Analysis of Variances. Thus each variance finds its way into a detailed statement, which should carry ample explanation of special matters. It is important that major differences be thor-

oughly run down before the reports are issued from the cost department. An important function is the cost analysis, by which adequate explanation of the facts is given on control reports.

Eliminate Accounting Discrepancies. One point is worth particular emphasis. It is too much the habit of cost accountants to issue reports which "tie in with the books" to the exclusion of real facts. Our bookkeeping must, of course, be accurate, and slipshod methods cannot be permitted. But the control reports which we issue are not accounting documents, but are fundamentally information for managerial control. This feature must be kept constantly in mind, and nothing permitted to cloud it. Over and over I have questioned some figure on a report, only to be met with a bland and ready exclamation, "Oh yes, that is due to this entry which failed to be put through last month". I propose that *discrepancies of a purely clerical nature should be eliminated from the reports* before they are presented to the heads of the financial and manufacturing departments. Let the clerks and accountants keep ready at hand reconciliation statements explaining how the figures tie in with the books, or let them add such reconciling figures as footnotes to the reports themselves, but let the reports present a just and fair picture of what the factory accomplished during the accounting period, which is what the factory manager must know.

Summary of Variances. The net result of various detailed cost and variance statements is combined in a cost summary. This gives the net result of each variance, with notes explaining major differences. The variances for the month are set in parallel columns together with those, say, of the previous month and of the year to date. With this same statement may be embodied a series of trend ratios showing the percentage of efficiency of each function month by month for a year or more. The brief summary statement gives in fact a bird's-eye view of all the operations of the factory period.

Operating Statement. The summary schedule supports in turn the operating statement, which in brief takes form as follows: (Refer to Diagram 1 for details).

OPERATING STATEMENT

Sales (in detail by classes of product)	$000
Less: Cost of Sales at Standard Cost (in detail by classes of product)	000
Gross Manufacturing Profit	000
Less: Adjustments to Manufacturing Costs (which is the total of the summary statement)	000
Net Manufacturing Profit	000

Selling and Administrative Expense	00	
Misc. Deductions from Income	00	
Net Profit		000

Reserve Accounts for Variances. As a general thing, all variances are written off monthly. If they are net credit variances, it may be desirable to accumulate them in a reserve account, but it would be poor accounting to carry any debit balances as deferred expenses on the balance sheet unless under exceptional circumstances. However, in businesses which are seasonal, where the variances fluctuate heavily from month to month, it may be desirable in some cases to write off a fixed amount each month, crediting a reserve account and charging all or part of these variances to the reserve, so as to equalize the net profit figures. The standard cost system is sufficiently flexible to permit of this being done.

In conclusion, let me repeat that the standard accounting system is much stronger if the standard costs are made part of the accounting structure than if they are reported as statistics only, as something extraneous to the books of account. When the actual variance entries are placed on the ledger, they assume far more importance and are treated with far more care. The system of accounts described above is practicable and I have operated it successfully in several concerns making widely different products.

Its essential value lies in the fact that it is a *control* system. It provides a cost accounting control which is commensurate with production control and the precision of modern factory management. By use of these reports, each of which embodies the fundamental "yardstick," the management is enabled to pass over the majority of cases where accomplishment is satisfactory and to concentrate upon the few cases which need attention. Furthermore, if the cost ledger clerks are actively on the job, the important points come to the clerks' attention immediately after the close of the month and are brought to the notice of the management directly they are discovered, without waiting for the formal issuance of the reports.

Finally, if conditions make it desirable, a report of any variance, may be made not only monthly, but weekly, and, if need be, daily, so that a very quick check may be made on factory efficiency. This applies especially to the output of machines during the hours when they are running. In most plants it is possible to summarize the burden efficiency variances and report them to the superintendent or the departmental foreman, say, by 10:00 o'clock on the following morning. Any degree of precision may be obtained by such a system provided it is worth the expense.

As previously stated, the question should always be asked whether some of these functions cannot be served better by a production control in quantity only, than by a cost accounting control

with values, because in many cases production control is as effective as cost control, cheaper, and often quicker. The point where production control should end and cost accounting control should start is a problem which each manufacturer must investigate carefully for himself. There is this to be said in favor of cost accounting control—values present a more effective story than quantities. Pounds avoirdupois may be treated disrespectfully, but nickels and dimes command attention. To tell a foreman that his efficiency for the previous week was 90% disturbs him somewhat, but to show him that he fell below standard to the extent of costing the company $400, causes him real concern.